

TABLE 3.—Maximum free-air wind velocities (m. p. s.), for different sections of the United States. Based on pilot-balloon observations during March 1943

| Section | Surface to 2,500 meters (m. s. l.) | | | | Between 2,500 and 5,000 meters (m. s. l.) | | | | Above 5,000 meters (m. s. l.) | | | | | | |
|----------------------------|------------------------------------|-----------|-----------------------|------|---|------------------|-----------|-----------------------|-------------------------------|----------------------------|------------------|-----------|-----------------------|------|----------------------------|
| | Maximum velocity | Direction | Altitude (m) m. s. l. | Date | Station | Maximum velocity | Direction | Altitude (m) m. s. l. | Date | Station | Maximum velocity | Direction | Altitude (m) m. s. l. | Date | Station |
| Northeast ¹ | 46.0 | w. | 2,180 | 17 | Toledo, Ohio..... | 54.6 | ws. | 5,000 | 2 | Caribou, Maine..... | 70.0 | sw. | 8,380 | 1 | Caribou, Maine. |
| East-Central ² | 40.0 | ws. | 1,650 | 6 | Raleigh, N. C..... | 50.0 | ws. | 4,700 | 7 | Washington, D. C.... | 73.0 | w. | 8,360 | 1 | Huntington, W. Va. |
| Southeast ³ | 30.0 | w. | 1,550 | 3 | Charleston, S. C.... | 49.0 | w. | 4,840 | 3 | Atlanta, Ga..... | 65.5 | wnw. | 11,600 | 23 | Tampa, Fla. |
| North-Central ⁴ | 47.6 | s. | 820 | 30 | International Falls, Minn. | 62.9 | wnw. | 5,000 | 26 | International Falls, Minn. | 63.0 | wnw. | 5,020 | 26 | International Falls, Minn. |
| Central ⁵ | 62.0 | ss. | 2,380 | 30 | Dodge City, Kans.... | 54.4 | w. | 2,550 | 17 | Des Moines, Iowa.... | 59.6 | sw. | 10,560 | 19 | Wichita, Kans. |
| South-Central ⁶ | 42.5 | sw. | 1,200 | 15 | Oklahoma City, Okla. | 44.2 | w. | 4,810 | 16 | Oklahoma City, Okla. | 64.0 | wnw. | 9,690 | 3 | Oklahoma City, Okla. |
| Northwest ⁷ | 47.4 | wnw. | 2,260 | 30 | Billings, Mont..... | 53.0 | wnw. | 4,420 | 12 | Billings, Mont..... | 70.0 | nw. | 9,330 | 15 | Tatoosh Island, Wash. |
| West-Central ⁸ | 36.4 | w. | 2,480 | 8 | Cheyenne, Wyo..... | 45.9 | wnw. | 5,000 | 14 | Redding, Calif..... | 63.0 | wnw. | 10,330 | 21 | Cheyenne, Wyo. |
| Southwest ⁹ | 48.2 | sw. | 2,290 | 18 | Winslow, Ariz..... | 62.0 | w. | 4,800 | 15 | Roswell, N. Mex..... | 68.1 | wnw. | 10,570 | 5 | Las Vegas, Nev. |

¹ Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, and Northern Ohio.

² Delaware, Maryland, Virginia, West Virginia, southern Ohio, Kentucky, eastern Tennessee, and North Carolina.

³ South Carolina, Georgia, Florida, and Alabama.

⁴ Michigan, Wisconsin, Minnesota, North Dakota, and South Dakota.

⁵ Indiana, Illinois, Iowa, Nebraska, Kansas, and Missouri.

⁶ Mississippi, Arkansas, Louisiana, Oklahoma, Texas (except El Paso), and western Tennessee.

⁷ Montana, Idaho, Washington, and Oregon.

⁸ Wyoming, Colorado, Utah, northern Nevada, and northern California.

⁹ Southern California, southern Nevada, Arizona, New Mexico, and extreme west Texas.

RIVER STAGES AND FLOODS

By BENNETT SWENSON

Following the driest February of record, with only three States having as much as normal precipitation, March was above normal except in the Northeastern States and in most of the Plains States. The western Lake region, most of the Ohio Valley and a large southeastern area had a considerable excess of precipitation. The March average for the entire country was 2.78 inches, or 2 percent above normal. This was the first month so far this year with as much as normal precipitation. The Nation-wide average for the first quarter of the year was 88 percent of normal with some of the interior sections having had only a little more than half of the normal.

The temperatures during March were well below normal over most of the country, the only sections having above normal being the Middle Atlantic States, the Pacific coast and the far Southwest. The subnormal temperatures were most pronounced in Montana. However, in that State, the weather changed abruptly in the last week of the month and unseasonably high temperatures and chinook effects melted the snow at lower elevations in the Missouri Basin. This snow melt produced the highest discharge of record at Bismarck and the highest stages since 1881 were experienced in the Missouri as far downstream as below Omaha, Nebr., in April.

Floods were widespread from heavy rains in the Gulf States, the lower Ohio River and tributaries, and in California. The rapid melting of the low-altitude snow cover in Montana and North Dakota caused destructive ice jams and floods in the upper Missouri Basin.

St. Lawrence Drainage.—Minor floods occurred in the Grand and Saginaw River Basins in Michigan and in the Maumee River at Fort Wayne, Ind., during the month. Damage amounting to about \$50,000 was reported in the Grand River Basin.

The rivers were above normal from rains early in March. Heavy rains averaging 2 inches fell over most of these watersheds on March 15 and 16. These rains, combined with moderately high temperatures on several days, caused the ice to break up and the rivers to rise rapidly, reaching near or slightly above flood stages. The Childs-

dale Dam on Rogue River, a tributary of the Grand River, gave way on March 16, resulting in overflow at the confluence of the Rogue and Grand Rivers.

Atlantic Slope Drainage.—In New England, precipitation was light during March. However, snow melt in the lower elevations caused rises in the streams to moderately above normal except in northern Maine. At Concord, N. H., the ice in the Merrimack River broke up on March 26 and in the Connecticut the ice began moving out on the 13th. An ice jam formed in the vicinity of White River Junction, Vt., causing the stage to go slightly above flood stage there on March 13 and again on the 19th.

Moderately high temperatures on the 15th–16th caused some melting of the snow cover in the Mohawk River Basin. Numerous small ice jams formed on that river and Schenectady, N. Y., experienced a slight amount of flooding on the 17th.

A rise occurred in the upper reaches of the Susquehanna River on March 16–17. The rise, which resulted chiefly from snow melt in the portion of the North Branch of the Susquehanna in New York, caused moderate flood stages at several points, mostly confined to New York.

Light floods occurred in most of the streams of eastern North Carolina and South Carolina, and in the Savannah River from frequent rains during the month. No damage of consequence resulted.

Moderately high floods were experienced in the Altamaha River system. Several periods of heavy rainfall occurred over the basin during the month, but none were of flood producing proportions until the heavy rains of the 17th to the 22d. On the morning of the 17th the precipitation averaged about 1 inch in the upper Ocmulgee River Basin, and slightly less than 1 inch in the upper Oconee Basin. Rains of over 1 inch were again reported on the 18th. During the period, 20th–22d, rains in the Ocmulgee Basin averaged 2 inches, and in the Oconee, 1.5 inches. This latter period of precipitation was sufficient to produce stages ranging from 3 to 5 feet above flood stage in the Ocmulgee, and from 9 feet above at Milledgeville, Ga., to 3 feet above at Mount Vernon, Ga., in the Oconee.

East Gulf of Mexico Drainage.—Heavy rains occurred on the 5th–6th, and in the northern portion on the 11th–12th. These rains were followed by unusually heavy falls

from the 17th to 21st, the heaviest concentrations coming on the 19th and 20th. The greatest monthly totals were recorded in the Leaf River Basin, covering about 3,000 square miles, where the average rainfall was 12½ inches. Of this total, almost 70 percent fell in the period of 5 days from the 17th to the 21st.

Severe flooding resulted in most of the drainage, particularly in southeastern Louisiana and southern Mississippi where record, or near record, stages were reached.

The excessive precipitation on the 19th and 20th was associated with earlier excessive rains in the lower Ohio Basin which caused extensive flooding in that basin. A discussion of the meteorological aspects of the storms causing these rains is given herewith.

On the morning of the 18th, the surface weather map showed a low-pressure system centered over the Texas Panhandle with a stationary front extending east-northeastward to the lower Ohio Valley. A strongly developing disturbance over southern Nevada retarded the eastward progress of the Texas Low.

A strong anticyclonic circulation over the southeastern United States extended to high altitudes and produced a strong inflow of moist tropical air over the Gulf States. Overrunning of this moist air over a cold air mass present over the lower Ohio Basin began to produce heavy rains in that area during the early afternoon of the 18th.

By evening the two disturbances had merged over northern Texas and the system began moving northeastward, and was centered over southeastern Missouri on the morning of the 19th. An active warm front extended eastward from the low center across Kentucky with the heaviest precipitation confined to the lower two-thirds of the Ohio Basin. The cold front extended from southeastern Missouri southwestward through central Arkansas and eastern Texas moving slowly eastward.

The disturbance moved rapidly north-northeastward, occluding over Lower Michigan by 8:30 p. m. of the 19th. Precipitation at this time decreased in intensity and was confined to the upper Ohio Basin. The cold front moved rather rapidly eastward over the Ohio Basin but the southern portion of the front was slowed up in its movement across the Gulf States. Oscillations of this portion of the front produced heavy rains in southeastern Louisiana and southern Mississippi during the night of the 19th-20th.

A wave formed along the front in the Gulf of Mexico south of the Louisiana coast during the night of the 20th, and by 8:30 a. m. of the 21st had developed into an intensive low centered over southeastern Alabama. Excessive rains in southeastern Louisiana, southern Mississippi, most of Alabama and portions of Georgia, accompanied the development and movement inland of this disturbance. The low moved east-northeastward, passing across the Georgia coast line during the evening of the 21st.

In the Chattahoochee-Apalachicola River Basin, heavy rainfall on the 5th-6th, averaging 1.5 inches in the upper reaches to more than 3 inches in the lower basin, produced moderate rises at all stations and a large rise at Blountstown, Fla. The heavy to excessive rains between the 17th and 21st produced unusually high stages in most of the basin. The total rainfall in the latter period averaged 4 to 6 inches over upper and middle portions of the Chattahoochee and Flint Rivers, with more than 10 inches over a small area to the north and east of Columbus, Ga. At Columbus and at Eufaula and Columbia, Ala., on the Chattahoochee and at Albany and Bainbridge, Ga., on the Flint River, the highest stages since 1929 occurred. Damages amounted to nearly \$75,000.

Moderate flooding took place in the Conecuh River,

exceeding flood stage by about 5 feet in the upper and by about 3 feet in the lower portion of the river. The Pea and Choctawhatchee had pronounced rises although flooding occurred only in the lower part of the Choctawhatchee River where flood stage was exceeded by about 1 foot. The average rainfall for the period 17th-21st was about 6 inches over these basins. The total losses from these floods have been estimated at \$10,000.

The Alabama River system rose to high flood proportions throughout most of the basin, approaching within about 3.5 feet of the highest stages of record in the lower Alabama River. The losses from the overflow have been estimated at about \$235,000. In the area of heaviest rainfall, much damage resulted from local washing and flooding from flash rises in small streams. This damage affected fields, roads, and small bridges, but for the most part is not included in the above total.

Precipitation for the 48 hours ending on the morning of March 21 in the Alabama River watershed averaged from 2.5 to 3 inches in the Coosa Basin above Gadsden, Ala., and 3.5 to 4 inches between Gadsden and Childersburg, Ala., including the Cahaba Basin. From Childersburg to Montgomery, Ala., including the Tallapoosa Basin, the 48-hour amounts ranged from 4 to 5 inches, and below Montgomery, 5 to 8 inches, with the greatest amount 8.4 inches at Haynesville, Ala.

A pronounced rise occurred in the Tombigbee River system from heavy rainfall in the upper basin on March 11-12. The upper Tombigbee exceeded flood stage by 0.3 foot at Aberdeen, Miss., on the 15th, and the Black Warrior at Tuscaloosa, Ala., crested at 51.2 feet (flood stage 47 feet) on the 14th. The Warrior receded until March 17, when additional rains caused another rise at Tuscaloosa. Further rains, of greater intensity, on March 20-21, over the Warrior and the lower Tombigbee basins increased the rate of rise.

The precipitation during the latter period ranged from about 2.5 inches in the upper Warrior Basin to over 7 inches at Lock No. 1, on the lower Tombigbee, of which 6.65 inches occurred during the 24 hours ending on the morning of the 21st.

The flooding was light in the extreme upper Tombigbee, but increased in severity in the lower Black Warrior and lower Tombigbee Rivers. The crest stages in the Tombigbee below Demopolis, Ala., were generally 6 feet or more below the highest stages of record. The damages from the flooding totalled about \$65,000.

The following is a report, submitted by the official in charge, Weather Bureau office, Meridian, Miss., of the floods that occurred in the Pearl and Pascagoula River basins:

While the preceding month was dry the soil became soaked from rains falling during the first 15 days of March and some rises had been registered; therefore, considerable damage resulted from the high waters caused by the widespread heavy rains from the 16th to the 26th. The average rainfall in the Pearl River Basin, comprising approximately 6,000 square miles of territory, was 10½ inches, or roughly six and one-half billion tons of water. The Chickasawhay Basin, draining a territory of a little over 6,600 square miles received about 10.2 inches of rain.

The greatest rainfall was in the Leaf River area, covering about 3,000 square miles, where the average rainfall was 12½ inches, almost 70 percent of which fell in a period of 5 days, from the 17th to the 21st. The run-off from the Chickasawhay and Leaf Rivers began to be felt in the Pascagoula River on the 20th and the waters rose steadily until the 25th to the 28th when they commenced to recede, although the river was above flood stage to the end of the month. In the Bogue Chitto River drainage basin very heavy rains occurred from the 17th to 21st and the stage at Franklinton, La., reached 18.3 feet on the 22d. This is 1.4 feet higher than the previous record crest of 16.9 on April 9, 1938.

In the upper reaches of all streams little damage was caused.

Practically no action had been taken in regard to starting spring crops and much high ground was easily accessible to livestock as the waters rose. In the area nearer the mouth of rivers the loss was considerable. There are many head of livestock feeding in the Pascagoula and Pearl River lowlands. About \$50,000 worth of livestock was lost by drowning, and other property, including highways and bridges, amounting to possibly \$60,000, was damaged.

Upper Mississippi Basin.—During the latter part of March, melting snow in the tributaries in Minnesota and Wisconsin below Lake Pepin produced floods in the Root, Zumbro-Whitewater and Trempealeau Rivers. The floods were not severe and agricultural damage was negligible at this early season. Slight damage resulted to pastures, highways, and bridges.

A moderate flood in the lower Rock River in Illinois resulted from moderately heavy rain on March 15-16. The rains, combined with moderating temperatures, served to reduce the heavy snow cover in Wisconsin and northern Illinois and increase the run-off. The river crested near Moline, Ill., at 13.4 feet on March 20. The high stage was increased somewhat by ice jams forming near the mouth of the river.

A light flood in the Illinois River from March 16 to the end of the month caused no material damage.

Missouri Basin.—Rapid melting of low-altitude snow in Montana and North Dakota during the latter part of March produced destructive floods in the upper Missouri River tributaries. The following reports on the floods are submitted by the officials in charge at the Weather Bureau offices indicated:

HELENA, MONT.

Rapidly melting snows during the last 10 days in March caused considerable damage from the 25th to the 31st. Two lives were lost, and considerable livestock drowned. Total aggregate property loss probably exceeded \$75,000.

In the vicinity of Helena, Lewis and Clark County, small creeks went out of bounds damaging secondary and feeder roads, small bridges, and culverts. One person was drowned near Helena in a flooded coulee on March 28. Basements of a few houses in Helena were flooded.

In the vicinity of Havre, Hill County, and extending eastward through the Milk River valley, heavy damage was done to highways and valley farm lands by the flooded waters of Milk River and its tributaries. One band of sheep, valued around \$10,000, was drowned and a man was drowned in Wayne Creek, near Harlem, Blaine County, when his car plunged off the road into the flooded creek, on March 31.

Much damage was done throughout the district by the unusually heavy and rapid runoff. The damage was scattered and locally of minor value, and cannot be estimated with any near adequacy.

BISMARCK, N. DAK.

Snow fell almost continuously over the entire State of North Dakota from March 14 to March 17. The snow was blown into huge drifts, many of them 10 to 15 feet deep so it was hard to determine the average snowfall or the water content of the snow. However, many observers remarked that it was the heaviest snowfall ever experienced in their respective localities and as temperatures were not low during the blizzard the water content of this very fine, hard packed snow was high.

From March 22 to 31, high temperatures and much sunshine prevailed and the snow melted rapidly. The ground was frozen and a previous snow melting had coated the ground with ice so there was more runoff than usual. By March 24, the Cannonball and Heart Rivers were running very high over the western reaches. Severe flooding occurred, beginning on the 24th from Glen Ullin, N. Dak., westward in the Heart River Basin.

The Cannonball, Heart, Knife, and Little Missouri Rivers, as well as the smaller streams in western North Dakota, were running bankful by the 23d. On the 25th, old timers west of Mandan, N. Dak., reported the Heart River higher than they had ever seen it. On the 26th the water began running into the city of Mandan and serious flooding occurred; in some of the lower parts of the city the water was nearly 10 feet deep.

The water in the Heart River and in Mandan began to recede on March 28. About \$600,000 damage occurred in Mandan, mostly to stored grain, personal and business property, and to highways and railroads.

U. S. Highway No. 10 was closed for nearly 2 weeks and main-line trains could not run west for 2 days. Trains from Mandan to Killdeer did not operate from March 24 until March 29 when partial service was restored. In some cases the damage was so great that service was still not resumed on April 15.

The Knife, Cannonball, and Little Missouri Rivers also began dropping slowly on the 28th. The greatest damage, about \$125,000, occurred on the Cannonball River due to the flooding in Mott, N. Dak., where about 500 families had to be evacuated. About 500 people in Beulah on the Knife River also had to leave their homes due to flooding, with an estimated damage of \$25,000. Damage along the Little Missouri River was also about \$25,000, mostly to livestock and feed.

The Missouri River was near flood stage from Williston to below Elbowoods beginning March 27 and considerable flooding occurred from the 29th to the 31st in the Williston to Washburn area. The losses along the Missouri during March were slight.

Floods also occurred from Sanish to Washburn on April 1 to April 2 and floods occurred between Bismarck and Washburn from April 1 to April 4, inclusive. During this period the river at Bismarck averaged 3 feet above flood stage and houses and hay stacks were under water for this entire period. More water flowed past Bismarck during this period than in any previous flood on record. About \$150,000 damage occurred along the Missouri River to houses and crops, with the greatest damage between Bismarck and Sanger 25 miles north of Bismarck.

SIoux CITY, IOWA

During the night of March 2-3 an ice gorge formed about 10 miles below Yankton, S. Dak., which gorge held solid until March 25. It was said to be the largest gorge in that vicinity since 1916. The water backed up causing a stage of 12.25 on March 13 and 13.3 on March 23. Slight overflow resulted but no damage of consequence.

Similarly, the night of March 1-2 an ice gorge formed about 5 or 6 miles below the Geddes, S. Dak., gage. A stage of 15.03 resulted on March 14, but only slight overflow resulted with no damage. On March 11 the gorge was reported as having a head of 6 feet.

About March 27 serious ice and flood conditions developed in the Bismarck, N. Dak., area, with tributaries the highest ever observed. In the meantime a phenomenal ice gorge developed some distance below the Mobridge, S. Dak., gage which caused a rapid rise due to the backwater and caused extensive overflow in the Mobridge area. A stage of 19.55 was recorded at 12.45 p. m. on March 28, at which time the gorge broke and passed downstream. This stage was the highest ever recorded at Mobridge and no doubt the highest ever observed at Mobridge by any residents.

Melting snows caused high water in the James River beginning about March 24 and continued into April. A stage of 13.9 was reached at Huron, S. Dak., on March 30. Although this was 2.9 feet above flood stage no flood loss was sustained since only farmland was affected and the season early.

The flood conditions which developed in and above the Bismarck area during the last few days of March caused the highest stages on record on the Missouri River at Mobridge, Pierre, Chamberlain, and Geddes, and the highest stage since 1881 at Yankton, S. Dak., and Sioux City, Iowa. Much farmland was flooded, as well as part of Fort Pierre, S. Dak., and damages will be extensive. A more complete report will be given later as soon as data are available.

Ohio Basin.—A flood developed in the lower Ohio River and tributaries during the month. Flood stage was not reached above Point Pleasant, W. Va., but the flood increased in severity from that point downstream. At Cincinnati, the crest was 59.9 feet on March 23, about 1 foot under the flood of last January, but from Louisville downstream, the March flood exceeded the January flood by several feet. Louisville crested at 65.1 feet against 62.7 feet in January, Evansville, 45.2 feet against 44.3 feet, and Cairo, 49.65 feet against 48 feet.

Rains were more or less general over the middle and lower portions of the Ohio watershed from March 10 to 20, being heaviest on the 18th and 19th. A description of the meteorological conditions during the latter period is given under the discussion of the floods that occurred in the East Gulf of Mexico drainage.

The earlier rains produced a moderate rise in the Ohio and the lower river was approaching flood stage when the heavy rains of March 18-19 began. These rains ranged from 2.5 to 4 inches in the vicinity of Cincinnati and from 4 to 6 inches in the Louisville area. At Louisville 5.8

inches of rain was recorded, establishing a new 24-hour record at that place. In the central portion of the Cumberland River basin, several stations reported 4 to 5.5 inches of rain in the 12 hours ending at 7 a. m. of the 19th.

In general, the rains of the 18th-19th were heaviest in about the lower two-thirds of the Ohio River basin and were concentrated near the main river. The effect of these excessive rains was a very rapid rise in the middle portion of the Ohio River and an almost simultaneous crest in the river from near Maysville, Ky., to near Leavenworth, Ind., a distance of over 200 miles.

Most of the tributaries from the Scioto and Licking Rivers downstream, except for the Tennessee River, were in high flood.

Pacific Slope drainage.—Heavy rains occurred on March 3-4 over the coastal and mountain areas of southern California which resulted in relatively minor floods in Altadena, Sierra Madre, and Eaton Canyon. Peak intensities of rainfall were recorded near midnight of March 3, the values reaching as high as 2.5 inches per hour at some points in the foothills north of Pasadena.

Streams in Fresno, Kern, Kings, and Tulare counties flooded from heavy rains in the mountain and foothills areas on the 9th and 10th, and again on the 17th and 18th. These rains were of cloudburst proportions.

The upper San Joaquin River rose considerably but did not flood. Kings River passed flood stage on March 9-10 with only minor damage. The Kaweah, Tule, and Kern Rivers, Deer Creek and other streams in that area flooded considerably causing much damage.

The overflow from these streams raised the level of Tulare Lake to near the top of the levees. Wave action caused breaks in the levees and flooding of 28,000 acres of agricultural lands.

The following report on the floods in the Sacramento Basin is submitted by the Weather Bureau office, Sacramento, Calif.:

The floods of early March 1943 in the Sacramento and San Joaquin River Valleys rank with the lesser floods of recent years, but its meteorological and hydrologic causes provide an excellent example of flood development to near critical stages as the result of what would appear to be an unimportant series of minor storms.

The month of February was marked by occasional periods of light rain and by warm weather conducive to snow melting from the mountain snow pack. Except for a few slight fluctuations, the rivers continued a slow recession until about March 5. On this date stages in the valley were moderately high and the ground was moist.

On March 4 a warm unstable Polar Pacific air mass moved over the valley and from March 4 to 8 a series of weak, diffused, occluded fronts brought light rain at intervals. An extremely unstable air mass, under the influence of strong westerly winds aloft, brought very heavy showers throughout the eastern foothills of the lower Sacramento and San Joaquin Valleys on the evening of March 9. The showers were extremely intense and quite general in the foothills area. The cloudburst rains occurred just as tributary streams were nearing crests from the earlier rains. Very little rain occurred north of the Feather River basin or in the drainage on the western side of the valley.

Crests were not unusually high at tributary stations, but the prolonged duration of moderately high flows filled the channel storage and caused stages to build up in the lower reaches of the rivers. It was necessary to open 10 gates at Sacramento Weir to hold the river in the vicinity of Sacramento below the flood stage of 29 feet. At H Street Bridge on the American River near Sacramento a crest of 41.3 feet caused considerable flooding. This stage was only 1.2 feet less than the crest in January of this year, although the crest stage at Folsom was 5.5 feet less and the peak discharge at Folsom only slightly more than half as much as in the January flood.

The Mokelumne River at Bensons Ferry reached a crest of 16.4 feet, which is 0.9 foot higher than any previous record. This resulted from the combined effect of long continued moderately high stages on the Cosumnes River, and abnormal contributions from lesser creeks rising in the foothills, notably Dry and Deer Creeks.

The total losses in the Sacramento Basin have been estimated at about \$235,000.

FLOOD-STAGE REPORT FOR MARCH 1943

[All dates in March unless otherwise specified]

| River and station | Flood stage | Above flood stages—dates | | Crest | | |
|---|-------------|--------------------------|----------|--------------|--------------|-------------|
| | | From— | To— | Stage | Date | |
| ST. LAWRENCE DRAINAGE | | | | | | |
| Lake Michigan | | | | | | |
| Red Cedar: | Feet | | | Feet | | |
| Williamston, Mich. | 7 | 16 | 18 | 8.0 | 16 | |
| East Lansing, Mich. | 8 | 16 | 18 | 9.3 | 17 | |
| Cass: Vassar, Mich. | 14 | 16 | 18 | 16.9 | 17 | |
| Grand: | | | | | | |
| Lansing, Mich. | 11 | 17 | 17 | 11.3 | 17 | |
| Ionia, Mich. | 21 | 16 | 19 | 22.4 | 17 | |
| Lowell, Mich. | 15 | 17 | 20 | 16.9 | 18 | |
| Lake Huron | | | | | | |
| Shiawassee: Owosso, Mich. | 7 | 16 | 17 | 7.7 | 16 | |
| Flint: Columbiaville, Mich. | 10 | 16 | 19 | 11.2 | 17 | |
| Lake Erie | | | | | | |
| St. Marys: Decatur, Ind. | 13 | 16 | 21 | 15.8 | 20 | |
| St. Joseph: | | | | | | |
| Fort Wayne, Ind. | 12 | 16 | 21 | 13.8 | 17 | |
| Montpelier, Ohio. | 10 | 16 | 20 | 11.9 | 17-18 | |
| Maumee: Fort Wayne, Ind. | 15 | 17 | 21 | 16.6 | 18 | |
| Sandusky: Upper Sandusky, Ohio. | 13 | 20 | 20 | 13.0 | 20 | |
| ATLANTIC SLOPE DRAINAGE | | | | | | |
| Connecticut: White River Junction, Vt. | 18 | { | 13 18 | 13 21 | 18.3 18.6 | 13 19 |
| James: | | | | | | |
| Bremo Bluff, Va. | 19 | | 15 | 15 | 19.0 | 15 |
| Columbia, Va. | 10 | | 14 | 23 | 18.5 | 15 |
| Roanoke: Williamston, N. C. | 10 | { | 11 23 | 15 | 10.5 11.0 | 13 28-31 |
| Neuse: | | | | | | |
| Neuse, N. C. | 14 | | 8 | 9 | 14.9 | 9 |
| Smithfield, N. C. | 13 | | 7 | 11 | 14.5 | 10 |
| Goldsboro, N. C. | 14 | | 12 | 12 | 14.0 | 12 |
| Cape Fear: Lock No. 2, Elizabethtown, N. C. | 20 | { | 8 23 | 11 25 | 25.9 23.1 | 9 24 |
| Pee Dee: | | | | | | |
| Cheraw, S. C. | 30 | | 7 | 8 | 30.8 | 8 |
| Mars Bluff Bridge, S. C. | 17 | { | 9 23 | 14 | 18.8 19.6 | 11-12 27 |
| Poston, S. C. | 18 | { | 14 27 | 16 Apr. 2 | 18.2 19.8 | 15 30-31 |
| Saluda: Pelzer, S. C. | 6 | | 20 | 24 | 7.0 | 22 |
| Broad: Blairs, S. C. | 14 | | 21 | 23 | 16.7 | 22 |
| Savannah: | | | | | | |
| Butler Creek, Ga. | 21 | | 22 | 24 | 23.8 | 23 |
| Burtens Ferry, Ga. | 15 | { | 11 23 | 13 | 15.7 20.4 | 12 26 |
| Clyo, Ga. | 11 | | 11 | (?) | 18.5 | 29 |
| Ogeechee: | | | | | | |
| Midville, Ga. | 6 | | 23 | 27 | 7.2 | 26 |
| Dover, Ga. | 7 | | 11 | (?) | 9.3 | 29 |
| Ocmulgee: | | | | | | |
| Macon, Ga. | 18 | { | 19 21 | 19 23 | 18.2 22.7 | 19 22 |
| Hawkinsville, Ga. | 25 | | 23 | 27 | 28.4 | 25 |
| Abbeville, Ga. | 11 | | 22 | (?) | 16.7 | 27 |
| Lumber City, Ga. | 15 | | 28 | (?) | 17.7 | 31 |
| Oconee: | | | | | | |
| Milledgeville, Ga. | 20 | | 21 | 24 | 29.0 | 22 |
| Dublin, Ga. | 21 | | 23 | 28 | 25.2 | 25 |
| Mount Vernon, Ga. | 16 | | 25 | (?) | 19.1 | 28 |
| Altamaha: | | | | | | |
| Charlotte, Ga. | 12 | { | 10 22 | 19 | 13.7 22.0 | 15 30 |
| Everett City, Ga. | 10 | | 29 | (?) | | |
| EAST GULF OF MEXICO DRAINAGE | | | | | | |
| Chattahoochee: | | | | | | |
| West Point, Ga. | 19 | | 21 | 22 | 20.3 | 22 |
| Columbus, Ga. | 34 | | 21 | 23 | 41.2 | 22 |
| Eufaula, Ala. | 40 | { | 19 21 | 19 25 | 41.5 55.4 | 19 23 |
| Columbia, Ala. | 42 | | 22 | 26 | 49.5 | 24 |
| Flint: | | | | | | |
| Montezuma, Ga. | 20 | | 22 | 25 | 22.6 | 24 |
| Albany, Ga. | 20 | | 21 | 30 | 29.8 | 25 |
| Bainbridge, Ga. | 25 | | 25 | (?) | 30.4 | 28-29 |
| Apalachicola: | | | | | | |
| River Junction, Fla. | 20 | | 22 | 30 | 25.8 | 27 |
| Blountstown, Fla. | 15 | | 5 | (?) | 23.5 | 27 |
| Concuh: | | | | | | |
| River Falls, Ala. | 35 | | 21 | 25 | 40.5 | 23 |
| Brewton, Ala. | 17 | | 23 | 28 | 20.5 | 26 |
| Choctawhatchee: Caryville, Fla. | 12 | | 23 | 29 | 13.1 | 26 |
| Oostanaula: | | | | | | |
| Resaca, Ga. | 22 | | 22 | 25 | 24.9 | 23 |
| Rome, Ga. | 25 | | 21 | 24 | 29.0 | 23 |
| Etowah: Cartersville, Ga. | 18 | | 20 | 22 | 25.3 | 22 |

See footnotes at end of table.